EXHIBIT 6

AWRC

Arkansas Water Resources Center

ILLINOIS RIVER PHOSPHORUS SAMPLING RESULTS AND MASS BALANCE COMPUTATION

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the following sub-basins: Muddy Fork, Osage Creek, and Spring Creek. Phosphorus loadings were determined on an annual basis.

Four point sources are located in the study area that discharge effluent directly into stream flow. Point sources discharge into the following sub-basins : Mud Creek, Muddy Fork, Osage Creek, and Spring Creek. Phosphorus loading and flow rates were obtained from each point source. Point source loadings were tabulated annually. Phosphorus loads are summarized in the Table 2.

Table 2: Phosphorus outputs and inputs collected for the IRDA

	1997 (kg P)	1998 (kg P)	1999 (kg P)	2000 (kg P)	2001 (kg P)
INPUTS					
EFFLUENT					
Mud Creek	1,859	2,500	1,579	2,361	1,366
Muddy Fork	1,812	1,897	1,855	1,096	1,211
Osage Creek	20,026	8,651	18,803	9,607	7,002
Spring Creek	59,521	53,684	79,998	91,128	101,363
Sum of point sources	*83,219*	*66,732*	*102,235*	*104,192*	*110,942*
SLUDGE					
Mud Creek[1]	0	0	0	0	0
Muddy Fork - Blue Mtn	101	171	106	0	0
Muddy Fork - Apple Hill	0	0	455	8,452	228
Muddy Fork - Blue Mist	57	0	0	0	0
Osage Creek	26,838	34,845	31,131	32,413	34,711
Spring Creek	54,969	49,648	56,297	60,904	87,254
Sum of sludge inputs/yr	*81,965*	*84,664*	*87,990*	*101,768*	*122,193*
ANIMALS					
Hogs/swines	52,896	51,642	48,485	47,483	45,800
Broilers	1,370,247	1,425,057	1,512,935	1,573,453	1,669,786
Layers	211,469	221,470	231,398	244,542	247,192
Turkeys	327,307	320,448	310,556	256,015	325,896
Cattle-beef	798,483	807,058	835,421	827,756	820,545
Dairy	47,920	43,118	36,721	36,721	36,179
Sum of animal inputs/yr	*2,808,322*	*2,868,793*	*2,975,517*	*2,985,969*	*3,145,398*
FERTILIZER					
Fertilizer	149,966	148,623	160,506	176,066	187,212
TOTAL INPUTS	3,123,472	3,168,811	3,326,248	3,367,996	3,565,744

Mass Balance

A mass balance is a simple way to investigate a system by looking at the inputs and outputs from a system. If the element that is being considered is conservative, that is, does not leave the system except through the measured output location, the mass balance can be illustrated with the following simple formula:

The estimates of point source discharges should be considered fairly accurate. Each of the permitted dischargers was asked the same series of questions to ascertain the methods of sample collection and analysis for phosphorus. The results were reported slightly differently with some reporting daily concentrations and some reporting monthly averages. But, they all represented flow-weighted mean values of total phosphorus. After receipt and compilation of the data, the dischargers were provided the results and conclusions and given a chance to verify their data and comment.

The estimates of outputs from the IRDA at the Highway 59 bridge are fairly accurate. They provide the best estimates of loading of any of the methods used historically, particularly for estimates of storm flow loads. Most of the past studies were performed with grab samples taken on even intervals (monthly). This type of sampling tends to have low precision and has an overall low bias (Nelson, et al, 1999). This type of sampling tends to miss storm events and thus does not adequately characterize the effects of the re-suspension of stream sediments.

A key concept for understanding this interpretation of the phosphorus mass balance is that once phosphorus is in the stream its is not being removed from the stream except downstream. That is not to say that it is not changing forms or perhaps even leaving the system temporarily, but that there is no net accumulation or removal from the stream. Phosphorus does go through a process called nutrient spiraling, where it goes through processes of biotic and abiotic transformations (Newbold, 1992, McClain et al, 1998). It is used as a nutrient by the steam biota such as algae and periphyton. The biota eventually dies and releases the nutrients back to the water to be used again. Or, it can be adsorbed to the sediments and organic matter accumulated in the stream bottom. The biota and sediments are also washed down stream during storm events. It may take several life cycles or several storm events to move from the headwaters of the system to the state line, but it all eventually does. There may be some minor exceptions to this and the true system is much more complicated than this simplification. For instance, the algae that consume the phosphorus are in turn consumed and the phosphorus is transferred up the food chain. It can eventually be transferred to land animals or insects that deposit the phosphorus in their manure or dead bodies on the land surface and not back in the river. But, there are probably as many of these processes transferring phosphorus from the land back to the river, so the net effect is zero.

This concept forms of phosphorus conservation is key to determining the different impacts of point and non-point source inputs. It is the viewpoint taken in this analysis and illustrated in Table 4. Point source inputs are discharged directly to the stream. The non-point source inputs identified are inputs to the surface of the land in the stream's watershed. The concept of P conservation in the stream implies that the point source discharges, which averaged 94,000 kg per year, accounted for 43% of the average river output of 243,000 kg per year. This, in turn, implies that the remaining 57% of the phosphorus in the river output originated from the non-point sources.

The loads can be differentiated between base flow and storm flow, which is defined as all flows and loads above five feet stage. The average base flow loads at the bridge